DOUBLE PENTODE

Double pentode intended for use as video output tube, sync. separator, A.G.C. amplifier or I.F. sound amplifier.

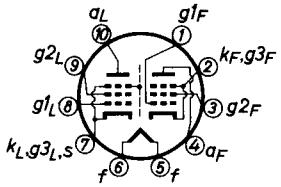
QUICK REFERENCE DATA			
F section			
Anode current	I_a	10	mA
Transconductance	S	8.5	mA/V
Amplification factor	$\mu_{g_2g_1}$	38	-
Internal resistance	R_i	150	kΩ
L section			
Anode current	I_a	30	mA
Transconductance	S	22	mA/V
Amplification factor	$\mu_{g_2g_1}$	38	-
Internal resistance	R_i	33	kΩ

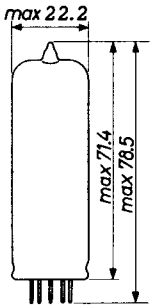
HEATING: Indirect by A.C. or D.C.; series supply

Heater current	I_f	300	mA
Heater voltage	V_f	17	V

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Decal





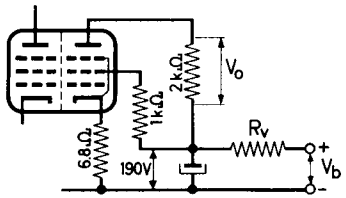
CAPACITANCES		L section	F section	
Anode to all except grid No.1	$C_{a(g_1)}$	6.5	10.5	pF
Grid No.1 to all except anode	$C_{g_1(a)}$	12.5	10.5	pF
Anode to grid No.1	C_{ag_1}	0.100	0.15	pF
Grid No.1 to heater	C_{g_1f}		max. 0.15	pF
Between the two pentode sections				
Anode L section to anode F section	$C_{a_La_F}$		max. 0.15	pF
Grid No.1 L section to grid No.1 F section	$C_{g_1Lg_1F}$		max. 0.01	pF
Anode L section to grid No.1 F section	$C_{a_Lg_1F}$		max. 0.10	pF
Grid No.1 L section to anode F section	$C_{g_1La_F}$		max. 0.005	pF

TYPICAL CHARACTERISTICS

Output pentode (L section)			
Anode voltage	V_a	170	V
Grid No.2 voltage	V_{g_2}	170	V
Grid No.1 voltage	V_{g_1}	-2.7	V
Anode current	I_a	30	mA
Grid No.2 current	I_{g_2}	7	mA
Transconductance	S	22	mA/V
Internal resistance	R_i	33	kΩ
Amplification factor	$\mu_{g_2g_1}$	38	-
Amplifier pentode (F section)			
Anode voltage	V_a	150	V
Grid No.2 voltage	V_{g_2}	150	V
Grid No.1 voltage	V_{g_1}	-2.1	V
Anode current	I_a	10	mA
Grid No.2 current	I_{g_2}	3.0	mA
Transconductance	S	8.5	mA/V
Internal resistance	R_i	150	kΩ
Amplification factor	$\mu_{g_2g_1}$	38	-

OPERATING CHARACTERISTICS

Output pentode (L section) as video output tube



Supply voltage	V_b	= 210 230 V
Series resistor	R_v	= 390 820 Ω

R_v should be added to avoid excessive dissipation

Input voltage (peak to peak)	V_{ip-p} = 3.6 V
Output voltage (peak to peak)	V_{op-p} = 100 V

Amplifier pentode (F section)

		Sync Separator		A.G.C. amplifier		I.F. amplifier	
Supply voltage	V_b	200 to 250	V				
Anode resistor	R_a	50	kΩ				
Anode voltage	V_a			100 to 150	V	150	V
Grid No. 2 voltage	V_{g_2}	75	V	60	V	150	V
Grid No. 1 resistor	R_{g_1}	1	MΩ				
Grid No. 1 voltage	V_{g_1}	-2.7	V	-1.5	V	-2.1	V
Anode current	I_a	0.1	mA	1	mA	10	mA
Transconductance	S	0.2	mA/V	2.0	mA/V	8.5	mA/V

LIMITING VALUES (Design centre rating system)

Output pentode (L section)

Anode voltage	V_{a_o}	max.	550	V
	V_a	max.	250	V
Anode dissipation	W_a	max.	5.1	W
Grid No.2 voltage	$V_{g_{2o}}$	max.	550	V
	V_{g_2}	max.	250	V
Grid No.2 dissipation	W_{g_2}	max.	2.5	W [1]
Grid No.1 resistor	R_{g_1}	max.	1	MΩ
Cathode current	I_k	max.	60	mA [2]
Cathode to heater voltage	V_{kf}	max.	200	V

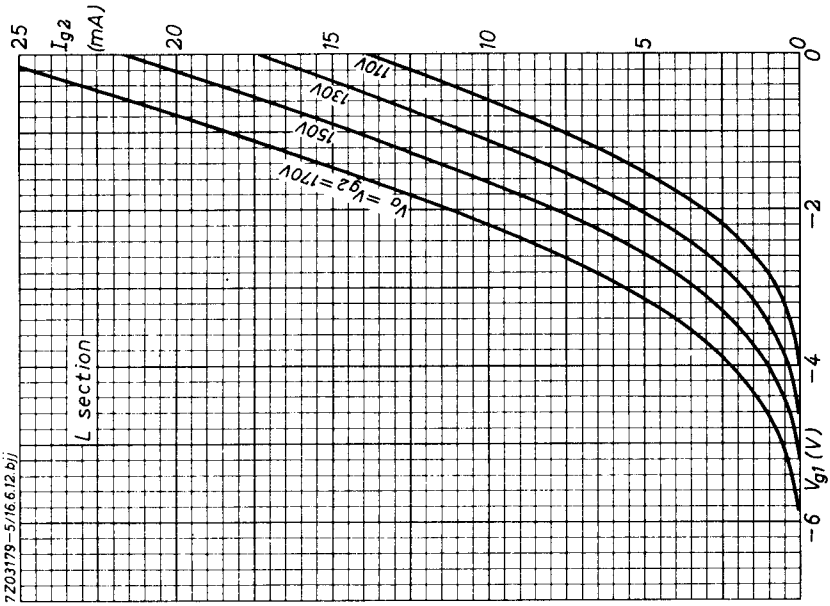
Amplifier pentode (F section)

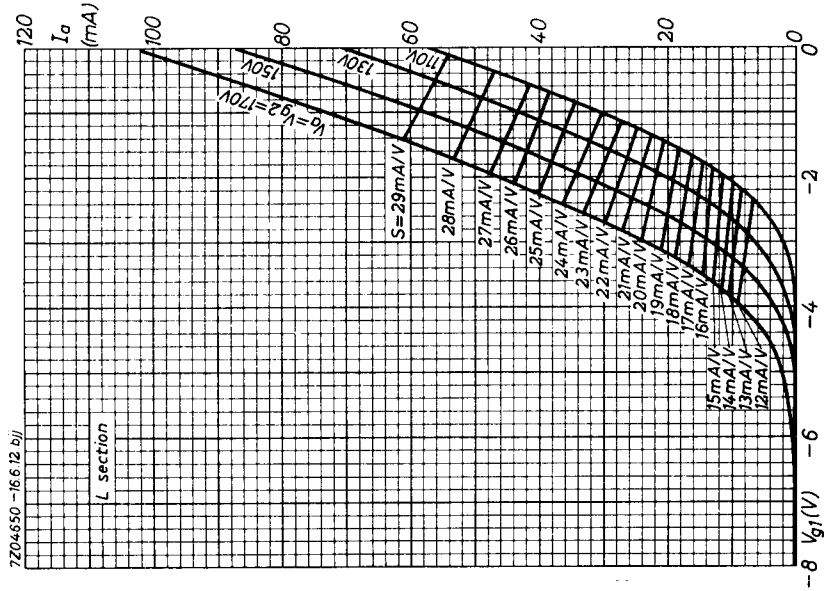
Anode voltage, peak ($I_a < 0.1$ mA)	V_{a_p}	max.	600	V [3]
	V_{a_o}	max.	550	V
	V_a	max.	250	V
Anode dissipation	W_a	max.	1.5	W
Grid No.2 voltage	$V_{g_{2o}}$	max.	550	V
	V_{g_2}	max.	250	V
Grid No.2 dissipation	W_{g_2}	max.	0.5	W
Grid No.1 resistor	R_{g_1}	max.	1	MΩ
Cathode current	I_k	max.	15	mA
Cathode to heater voltage	V_{kf}	max.	200	V

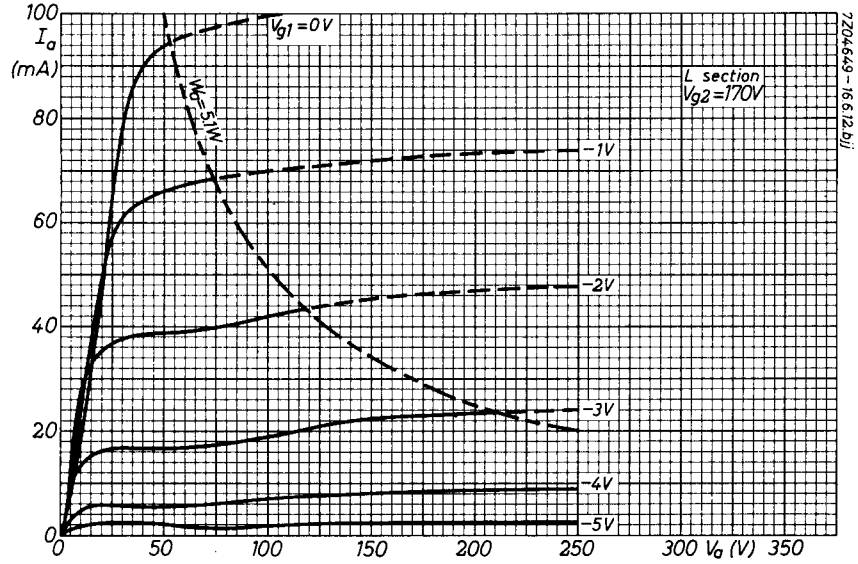
[1]) During short periods W_{g_2} = max. 3.2 W

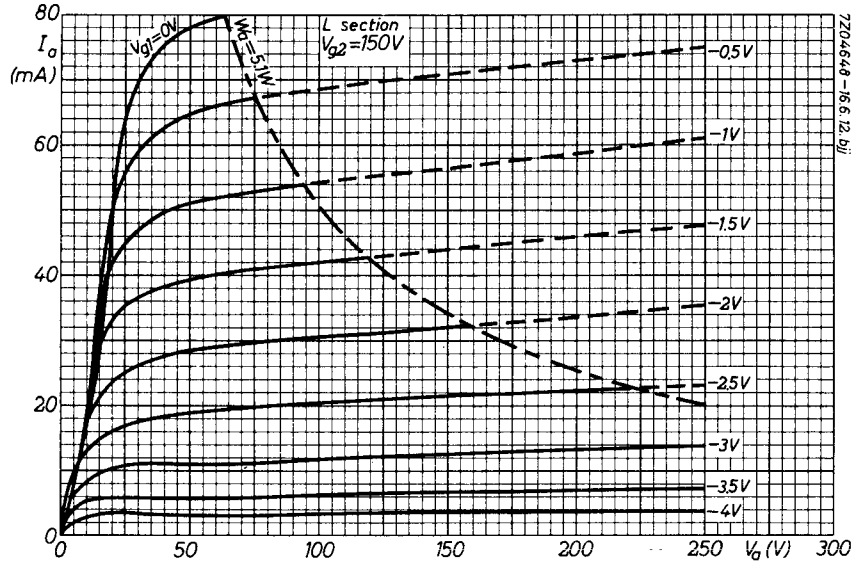
[2]) During short periods I_k = max. 85 mA

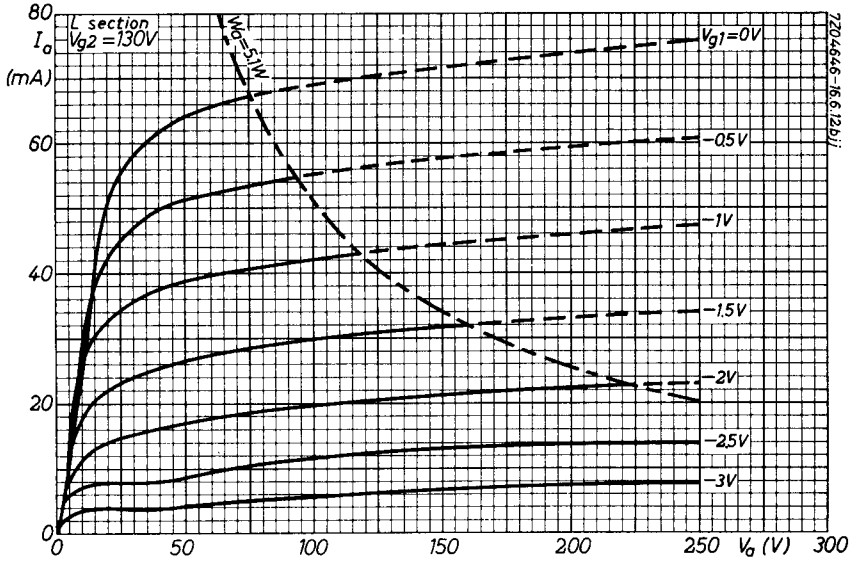
[3]) Max. pulse duration 18% of a cycle, with a max. of 18 μsec.

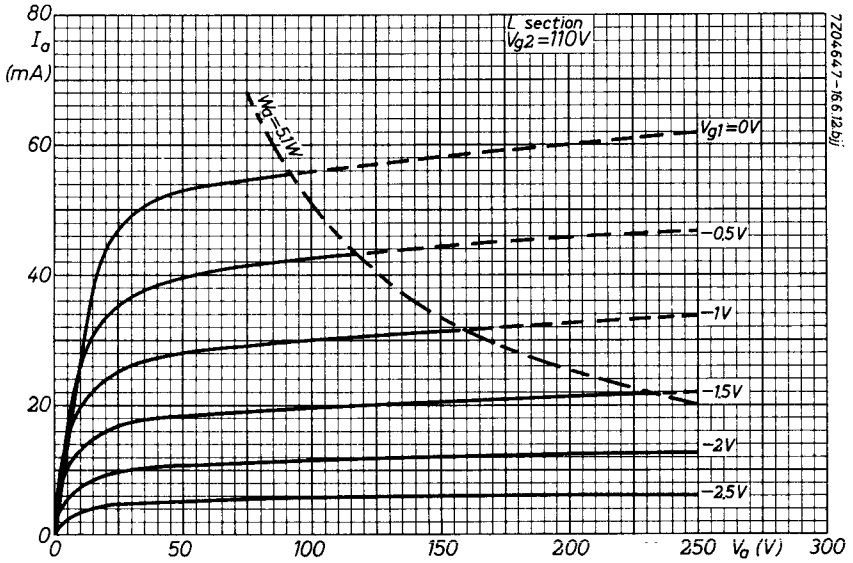

7203179-5/16.6.12.bij
L section
I_{g2} (mA)
25
20
15
10
5
0
$V_a = V_{g2} = 170V$
150V
130V
110V
-2
-4
-6
V_{g1} (V)

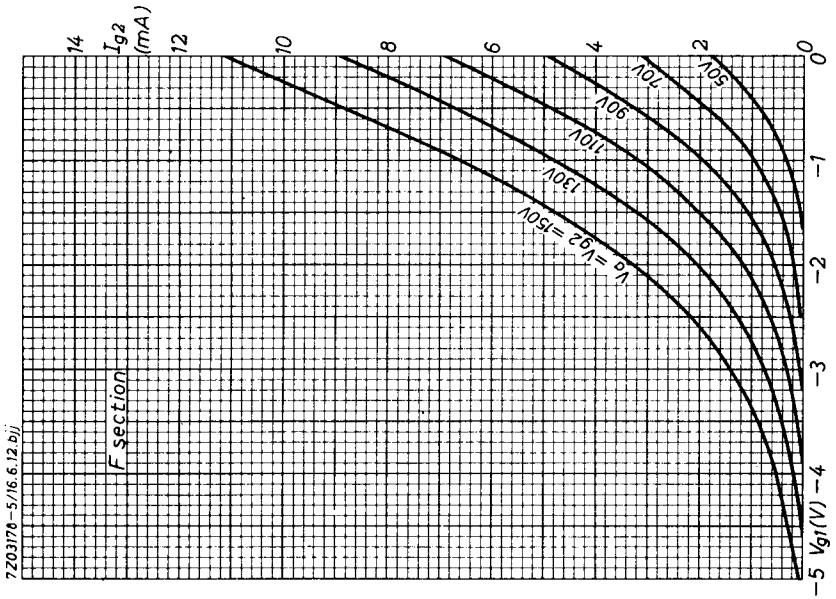

7Z04650-16.6.12.bij
L section
I_a (mA)
120
100
80
60
40
20
0
$V_a = V_{g2} = 170V$
150V
130V
110V
S=29mA/V
28mA/V
27mA/V
26mA/V
25mA/V
24mA/V
23mA/V
22mA/V
21mA/V
20mA/V
19mA/V
18mA/V
17mA/V
16mA/V
15mA/V
14mA/V
13mA/V
12mA/V
-2
-4
-6
-8
V_{g1} (V)

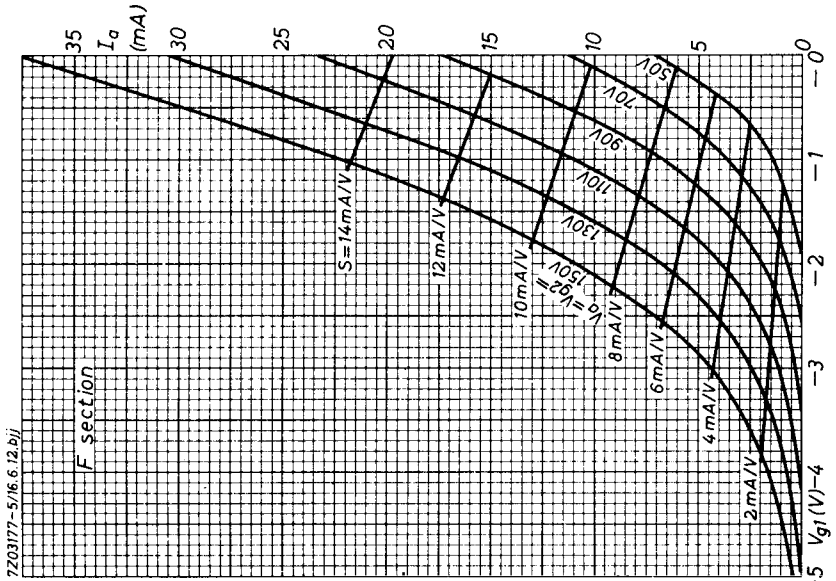

100
I_a
(mA)
80
60
40
20
0
0
50
100
150
200
250
300 V_a (V) 350
V_{g1} = 0 V
W_a = 5,1 W
L section
V_{g2} = 170 V
-1V
-2V
-3V
-4V
-5V
7204649 - 16.6.12.bij

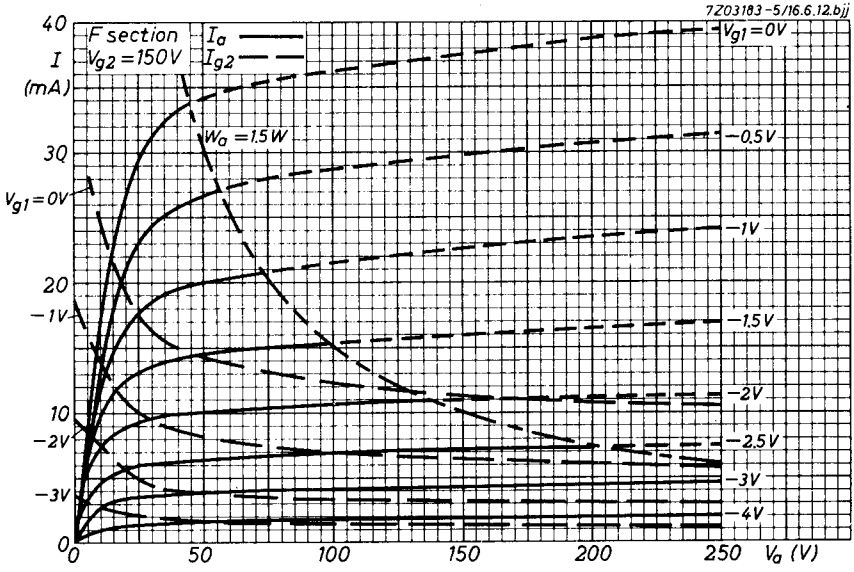

80
I_a
(mA)
60
40
20
0
0
50
100
150
200
250 V_a (V) 300
V_{g1} = 0 V
W_a = 5,1 W
L section
V_{g2} = 150 V
-0,5 V
-1V
-1,5 V
-2V
-2,5 V
-3V
-3,5 V
-4V
7204648 - 16.6.12.bij

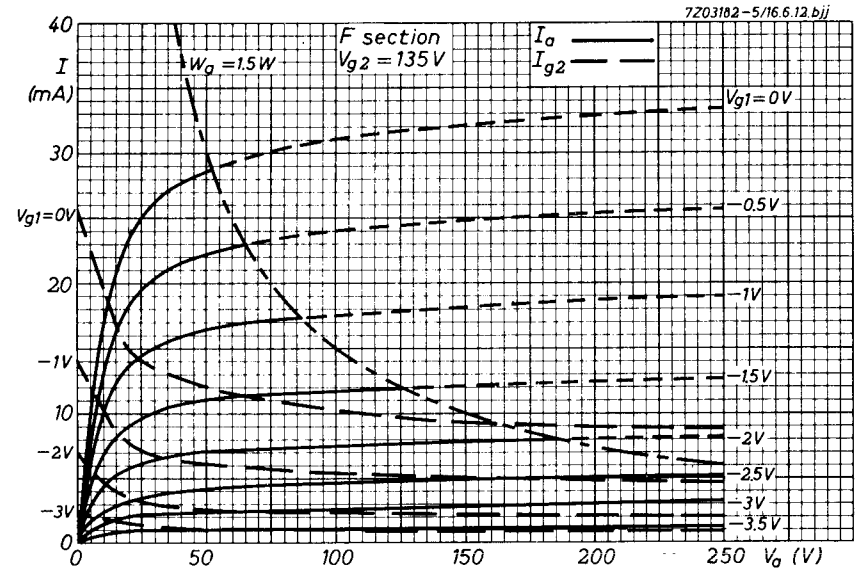

L section
Vg2 =130V
Wg=5,1W
Vg1=0V
-0,5V
-1V
-1,5V
-2V
-2,5V
-3V
80
Ia
(mA)
60
40
20
0
0
50
100
150
200
250
Va (V)
300
7204646-16.6.12bij

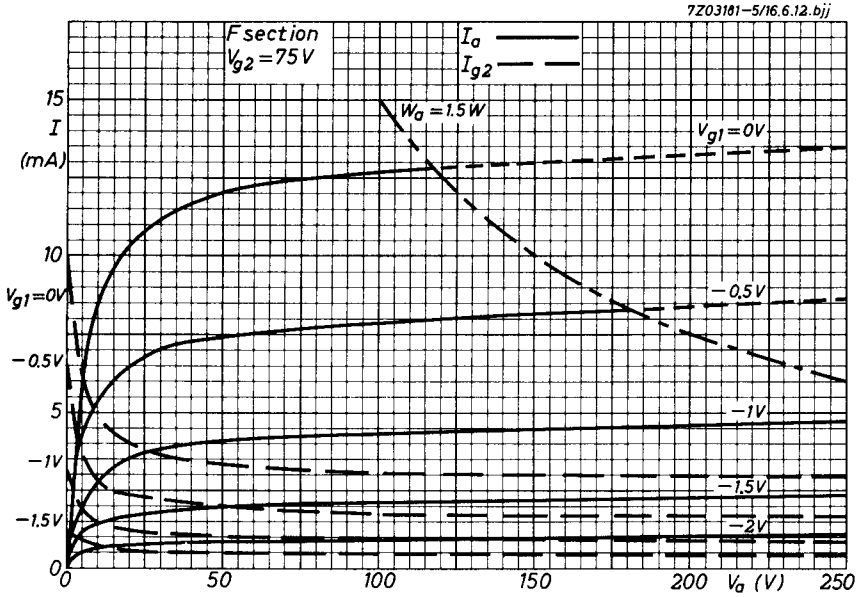

L section
Vg2 =110V
Wg=5,1W
Vg1=0V
-0,5V
-1V
-1,5V
-2V
-2,5V
80
Ia
(mA)
60
40
20
0
0
50
100
150
200
250
Va (V)
300
7204647-16.6.12bij

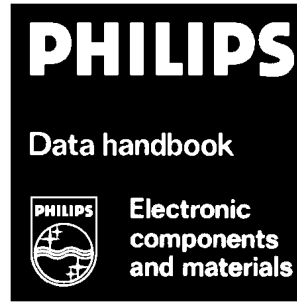

7Z03178-5/16.6.12.bij
F section
I_{g2} (mA)
14
12
10
8
6
4
2
0
$V_a = V_{g2}$ = 150V
130V
110V
90V
70V
50V
−5 V_{g1}(V) −4
−3
−2
−1
0


7Z03177-5/16.6.12.bij
F section
I_a (mA)
35
30
25
20
15
10
5
0
S = 14mA/V
12mA/V
10mA/V
8mA/V
6mA/V
4mA/V
2mA/V
$V_a = V_{g2}$ = 150V
130V
110V
90V
70V
50V
−5 V_{g1}(V) −4
−3
−2
−1
0


7Z03183-5/16.6.12.bjj
F section
V_{g2} = 150 V
I_a
I_{g2}
W_a = 1.5 W
I (mA)
V_{g1} = 0 V
−0.5 V
−1 V
−1.5 V
−2 V
−2.5 V
−3 V
−4 V
40
30
20
10
0
−1 V
−2 V
−3 V
0
50
100
150
200
250
V_a (V)


7Z03182-5/16.6.12.bjj
F section
V_{g2} = 135 V
I_a
I_{g2}
W_a = 1.5 W
I (mA)
V_{g1} = 0 V
−0.5 V
−1 V
−1.5 V
−2 V
−2.5 V
−3 V
−3.5 V
40
30
20
10
0
−1 V
−2 V
−3 V
0
50
100
150
200
250
V_a (V)


7Z03181-5/16.6.12.bjj
F section
V_{g2} = 75 V
I_a
I_{g2}
W_a = 1.5 W
V_{g1} = 0 V
−0.5 V
−1 V
−1.5 V
−2 V
I (mA)
15
10
5
0
V_{g1} = 0 V
−0.5 V
−1 V
−1.5 V
0
50
100
150
200
250
V_a (V)



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